

What Is Claimed Is:

1. Process for the formation of a nonwoven consisting of the following process steps:

in the same web forming process, two separate partial webs are formed out of the same raw fibers or raw fiber blend respectively on a web forming device with two web doffers,

the partial web - hereinafter called "faster partial web" - taken off at a web doffer is taken out of the web forming process at a several times higher speed than the other partial web - hereinafter called "slower partial web".

the faster partial web is laid in zigzag to form a new partial web - hereinafter called "cross-fiber partial web" - with a width corresponding to the width of the slower partial web and at a running speed corresponding to the speed of the slower partial web, where the fibers are mainly oriented at right angles to the longitudinal direction of the cross-fiber partial web

the cross-fiber partial web and the slower partial web are synchronised and are brought together at the same speed, with the same direction and with the same position in cross direction to form a double-layer web hereinafter called "complete web",

the complete web produced in this way is bonded to form a nonwoven.

2. Process according to claim 1, wherein the faster partial web is first redirected to a running direction which is at right angles to the working direction of the web forming device and is only from this direction laid in zigzag to form the cross-fiber partial web and thereby is again redirected immanent to the process, so that its running direction - seen from above - is in alignment with the working direction of the web forming device, that the slower partial web is lead around the web redirecting device for the faster partial web and the web laying device for laying the cross-fiber partial web and that afterwards both partial webs are united to a complete web.

3. Process according to claim 1, wherein the faster partial web is directly laid to form the cross-fiber partial web and as a result is redirected immanent to the process to a working direction, which is at right angles to the working direction of the web forming device and that the cross-fiber partial web afterwards is redirected again from this cross working direction to take a direction parallel to the working direction of the web forming device and brought into alignment with the slower partial web.

4. Process according to claim 1, wherein the faster partial web is directly laid to form the cross-fiber partial web and as a result is redirected immanent to the process in a working direction, which is at right angles to the working direction of the web forming device and that also the slower partial web is redirected in this cross working direction and is brought into alignment with the cross-fiber partial web.

5. Process according to claim 1, wherein the zigzag partial layers within the cross-fiber partial web are laid under such an angle the sine value of which corresponds to the value of a proper fraction in the form  $1/n$  where  $n$  is an integer less than seven.

6. Process according to claim 1, wherein the partial layers to be laid in zigzag within the cross-fiber partial web are laid under one of the angles  $\alpha$  mentioned in the following:  $30,0^\circ$  ( $\sin \alpha = 1/2$ ), about  $19,5^\circ$  ( $\sin \alpha = 1/3$ ), about  $14,5^\circ$  ( $\sin \alpha = 1/4$ ) or about  $11,5^\circ$  ( $\sin \alpha = 1/5$ ).

7. Process according to claim 1, wherein the faster partial web is taken off from the web forming device with a speed which is by a corresponding integral multiple higher than the slower partial web, namely at one of the following speeds: at double, at threefold, at fourfold, at fivefold speed.

8. Process according to claim 1, wherein the web forming device takes in rough approximation - allowing for a difference of  $\pm 20$  percent in weight - a fiber mass of approximately the same size per unit of time in case of the faster partial web as in case of the slower partial web.

9. Process according to claim 1, wherein the faster partial web is taken off from the web forming device at a web doffer situated in a lower position and the slower partial web is taken off at a web doffer situated in a higher position.

10. Apparatus for manufacturing of a nonwoven consisting of the following system components:

a web forming card with two web doffers staggered in height, where the one, preferably lower web doffer - hereinafter called "faster web doffer" - is designed in such a way that it allows for a several times higher doffing speed  $v_2$  when doffing the partial web - hereinafter called "faster partial web" - at this point than the speed of the other doffer - hereinafter called "slower doffer" - at which a partial web - hereinafter called "slower partial web" - can be doffed,

a web laying device assigned to the faster web doffer and connected to it by means of web transport belts

to lay the faster partial web in zigzag to form a new partial web hereinafter called "cross-fiber partial web", with a width corresponding to the original width of the faster partial web and with fibers mainly oriented at right angles to the longitudinal direction of the cross-fiber partial web,

another device to direct the cross-fiber partial web to the slower partial web at the same speed, with the same direction as well as the same position in cross direction in order to unite these to form a multilayer web hereinafter called "complete web",

finally a device for bonding the complete web to form a nonwoven.

11. Apparatus according to claim 11, wherein the device for the orientation of the cross-fiber partial web and the slower partial web to each other in order to unite the partial webs to form the complete web contains a web redirecting device - assigned to one of the partial webs and staggered in height with regard to the web laying device - which effects a redirection of the assigned partial web by 90° with regard to its running direction as seen from above, the web redirecting device being arranged with regard to its part effecting the redirection - seen from above - approximately at the same position as

the effecting part of the web laying device for the faster partial web.

12. Apparatus according to claim 11, wherein the web re-  
5 directing device is assigned to the faster partial web and is functionally preceding the web laying device, so that in the course of the faster partial web or the cross-fiber partial web respectively, because of the two redirections compensating each other in the end, the running direction of the united complete  
10 web - seen from above - is in alignment with the working direction of the web forming card.

13. Apparatus according to claim 11, wherein the web re-  
directing device is assigned to the cross-fiber partial web and  
15 is functionally succeeding the web laying device, so that in the course of the faster partial web or the cross-fiber partial web respectively, because of the two redirections compensating each other in the end, the running direction of the united complete web - seen from above - is in true alignment with the  
20 working direction of the web forming card.

14. Apparatus according to claim 11, wherein the web re-  
directing device is assigned to the slower partial web, and  
that not only the running direction - seen from above - of the  
25 slower partial web namely by the web redirecting device but

also the running direction of the faster partial web and the resulting cross-fiber partial web namely by the web redirecting device each are redirected by 90°, so that the running direction of the completed web formed by the partial webs - as seen from above - is arranged at right angles to the working direction of the web forming card.

15. Apparatus according to claim 11, wherein the web redirecting device staggered in height with regard to the web laying device consists mainly of a driven endless guiding belt, which is guided in a square polygon, preferably in a rectangle via not rotating turning rods, the neighbouring sections of the which follow each other at each a turning rod enclose with regard to the lateral sides of the guiding belt - seen from above - an at least approximate right angle, whereas the respective top and bottom sides of the guiding belt are arranged mainly in parallel to each another, and where one of the four turning rods hereinafter called "web redirecting rod" is arranged - seen from above - at almost the same position to the web laying device and where the partial web to be redirected is guided by the two sections of the guiding belt coming together at the web redirecting rod and is redirected with it.

16. Apparatus according to claim 11, wherein the guiding belt of the web redirecting device is driven at the speed of the assigned partial web.

5 17. Apparatus according to claim 11, wherein the guiding belt of the web redirecting device is arranged on two different levels having a distance from each other to use a minimum of space, by arranging in the section of the guiding belt coming from the web redirecting rod and in the section diametrically  
10 opposed, approximately in the middle, each a turning roll surrounded by this section by by 180°.